MONTANA
Natural Heritage Program

A program of the
Natural Resource Information System,
Montana State Library
in partnership with
The Nature Conservancy

. optimo·locus .

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In This Issue

New On Our Website

http://nhp.nris.state.mt.us/

Online Animal Guide

The Online Animal Field Guide has **extensive new information on over 80 animal Species of Concern**, as well as over 500 other animal species that occur in Montana (See Feature Article, this page).

Online Plant Guide

The Online Plant Field Guide now has **expanded information on habitat, ecology and management** for over 50 Species of Concern occurring on BLM lands in Montana. Check it out!

Reports Added

Milk and Marias River Watersheds: Assessing and Maintaining the Health of Wetland Communities, *June 2003*

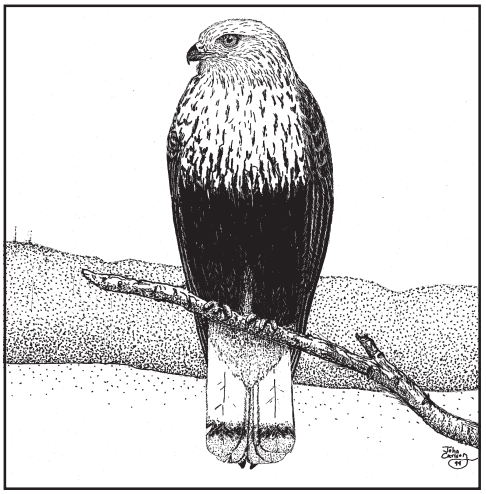
Wildfire Succession In Plant Communities Natural to the Alkali Creek Vicinity, Charles M. Russell Wildlife Refuge, Montana, *November 2001*

Biodiversity and Representativeness of Research Natural Areas on National Wildlife Refuges in Montana, *August 1999*

Internet Field Guide to Montana's Animals

The Natural Heritage Program (NHP) zoologists, working in partnership with Montana Fish, Wildlife & Parks (MFWP) recently completed a major upgrade to the online "Montana Animal Field Guide," a joint project of the two programs. This encyclopedic website combines information from the NHP databases and MFWP to provide extensive, detailed profiles of nearly 650 species of vertebrate animals in Montana, including fish, birds, mammals, reptiles and amphibians.

The Field Guide offers a broad range of information, including species description and recognition, range, habitat, reproduction, food habits, ecology and management and references. Photos and Montana range maps are also provided for most species. Users can view lists of species by animal group or search by name. Through the Natural Heritage Program homepage, they can also link to the website of NatureServe (our international affiliate), where color-coded status maps are available that show the North American distribution and conservation status (based on state/provincial ranks) of all the continent's animal and plant species.



Rough-legged Hawk (*Buteo lagopus*). Illustration by John Carlson.

Much of the initial information for the Animal Field Guide website came from the databases of NatureServe and from materials developed locally by MFWP and other sources. Heritage staff have now greatly expanded that information for over 80 animals considered Montana "Species of Concern." This expansion involved extensive reviewing, editing and integration of Montana specific information from publications, reports, field data and local expertise. This work was funded by a grant from the Institute for Museum and Library Services to NRIS, our parent program at the Montana State Library. Additional funding from the Bureau of Land Management and MFWP was also key, and will enable NHP staff to continue improving the Field Guide and adding photos, more information on fish and invertebrates, and explanations of state status ranks.

The Montana AnimalField Guide is designed to serve as an information resource for identification, research and habitat management, as well an easy way for students of all ages to expand knowledge and appreciation of Montana's impressive wildlife heritage. It can be accessed through the NRIS/Natural Heritage Program webpage at http://nhp.nris.state.mt.us/ and the Montana Fish, Wildlife and Parks webpage at http://www.fwp.state.mt.us/.

- Sue Crispin

Optimolocus, pronounced *"op-tih-moe-lo-cus,"* from Latin *optimo* - best and *locus* - place; after *Enallagma optimolocus*, a damselfly found only in Montana.

Director's Scope:

This month, we're announcing completion of a new, expanded Online Field Guide to Montana's Animals. The project was a big milestone for our program, spanning two years and requiring a major effort from staff. As is often the nature of work in a Heritage Program, most of it takes place behind the scenes. Building the databases and machinery – like web applications – that can deliver usable information takes a great deal of time and attention to detail.

In the case of the Field Guide, Heritage zoologists and other staff invested enormous effort in harvesting information on Species of Concern from publications, surveys and experts, and then synthesized it into a meaningful format and incorporating it into our databases. The result is an Internet-based Field Guide that is comprehensive, integrating local and international data, and dynamic, drawing directly from our Heritage data system and pulling in new information as it's added.

Another big "behind the scenes" effort that we're undertaking this winter is extensive updating of our Element Occurrence ("EO") database. Although information is always being added to the database, it's been several years since we've given many species a thorough review and update. This review is especially needed for complex and highly mobile animals and other species for which extensive new data have been collected. To accurately depict "occurrences" – documented areas of occupied habitat – requires a great deal of data analysis and interpretation and often consultation with experts.

Our new BIOTICS database system now enables us to depict these occurrences with a great precision in a GIS format; however, highly precise mapping requires a much greater time investment in determining boundaries. We must also ensure the use of consistent standards to interpret available data and thoroughly document the resulting EO polygons. The payoff for this major data overhaul will be a much more up-to-date, accurate and information-rich Element Occurrence database for many species.

Two other important initiatives will be getting underway this winter. One involves embarking on a significant expansion of our biological information resources to include aquatic ecosystems. Dave Stagliano has come on board as our Aquatic Ecologist to lead this major effort. Finally, we will be updating our programmatic strategic plan and will be contacting many of you to get your input on needs and priorities — as well as feedback on what we're doing well and what we need to do better.

So...we will certainly not have time to hibernate this winter – we'll be very busy!

- Sue Crispin

Peatlands in Northwest Montana

In 2002, Natural Heritage Program ecologists surveyed peatlands on the Kootenai National Forest in northwestern Montana through a cooperative project with the U.S. Forest Service. Peatlands are an uncommon type of wetland in Montana and support 40 plant species of concern or about 9% of the state's rare flora. These species-rich wetlands are characterized by wet, organic, and nutrient-poor soils. Widespread timber harvesting and related road building have raised concerns that increased sedimentation and nutrient inputs may alter vegetation diversity and nutrient balances. Although existing regulations require small buffers to be left around peatlands, the effectiveness of those buffers have not been evaluated.

In order to test the effectiveness of these buffers, Heritage ecologists sampled eight ecologically similar rich fens, comparing the extent of roading and logging within 50- to 200-meter buffers to vegetation and soil nutrient concentrations within the fens. The results showed that soil nutrients increased as the buffer area – the average distance from the peatland boundary to the nearest road or clearcut – decreased. This relationship was observed at distances of up to 100 meters from peatlands. Increased nutrient concentrations were in turn associated with decreased richness and diversity of vascular plants. We also found that the occurrence of rare species was associated with high vascular plant diversity. These results are significant because the conservation value of peatlands is due in part to the high diversity of species and the large number of rare taxa that they support.

Floating mat around Rainbow Lake, Kootenai National Forest

This study suggests that buffer widths required under existing regulations (8-30 meters) do not effectively protect peatlands from adjacent land uses. Increasing buffer distances to 50 or 100 meters may help reduce nutrient inputs from adjacent land uses and thereby maintain the quality of these distinctive wetlands.

- Marc Jones

Did You Know?

The Natural Heritage Program Website logged 14,276 visitor sessions in October from 6,512 different users. With an average visitor session of just over 11 minutes, this means folks spent 2617 person-hours or 109 person-days obtaining information from our Website in October!

New Insights into Montana's Bats

Bats don't get much respect — in fact, they are the least studied and understood of Montana's mammals. Fifteen species of bats live in the state and are our only nocturnal insect predators, eating moths, mosquitoes, gnats and crop insects. A single little brown bat — *Myotis lucifugus* — can eat around 1,200 mosquitoes in one hour! A May, 2003 article in the *Helena Independent Record* estimated that if bats disappeared, it would cost billions of dollars to get rid of the insects that they consume (Chafin 2003). Bats also play a priceless role in fighting the spread of diseases like West Nile virus, which is carried by mosquitoes.

Recently, many species of North American bats have been declining at alarming rates due to loss of natural roosting sites and from loss of foraging habitat (Pierson 1998). Of 45 bat species in the U.S., six are now federally listed and 20 others are considered species of concern (Harvey et al. 1999). Because so little is known about bats, knowledge is the first step toward ensuring that these animals will survive to perform their subtle but important role in our natural systems. Fortunately, that knowledge took a tremendous step forward this past summer, as Natural Heritage Zoologists and partners launched the most intensive program of surveys and research to date.

The Heritage zoology crew, including Paul Hendricks, Susan Lenard, Coburn Currier and intern Joe Johnson, conducted surveys of bats in several areas of eastern Montana. One of the most interesting studies, funded by the Montana Department of Transportation, involved surveying highway bridges to determine the extent and patterns of bat use in the Billings area. The results of this work were even more productive than we had hoped. Previous work suggested that bats seldom use highway structures (bridges and culverts) this far north. However, we found bats using over half of the 136 highway structures inspected. Most were used as night roosts, where individuals paused briefly to digest a meal and rest. Twelve day roosts, where bats spend daylight hours, were also discovered, and three of these day roosts hosted maternity colonies. We expected day roosts to be placed almost exclusively in highway structures built from concrete, but instead found that wooden bridges housed five of the twelve day roosts (including the three maternity colonies). Results of this work will be summarized in a report scheduled for completion this winter.

Heritage Zoologist Susan Lenard and Zoology Intern Joe Johnson mist-netting for bats in a Cottonwood stand on the Missouri River.

Other projects, funded by the U.S. Bureau of Land Management (BLM), involved surveys of riparian areas on the Yellowstone and the Upper Missouri Rivers and upland areas in the Pryor and Bull Mountains to assess bat species diversity and habitats. Surveys along the Yellowstone River, the first ever to focus on bat use, were especially productive and identified a number of bat species using these areas. We trapped bats using mist nets and also recorded bat calls to detect species not documented through trapping efforts. Mist net trapping was slow, due to the late season, but we did record calls of many different bats and are now analyzing the data to identify species. This work will be continued next summer.

Surveys along the Missouri River from Virgelle downstream to the Fred Robinson Bridge were also productive, with a number of bat species identified in riparian habitats. Highlights of this trip included detection of two Montana Species of Concern: a Spotted Bat (*Euderma maculatum*, G4 / S1), suspected to occur along the river and confirmed during our surveys, and Townsend's Big-eared Bat (*Corynorhinus townsendii*, G4 / S2S3) at a new locality. Our work was complemented by two other studies of bats along the Missouri River corridor: Cori Lauson, a graduate student from the University of Alberta, conducted surveys along the Missouri and Marias Rivers, and Joanne Stewart from the University of Denver surveyed along the lower Missouri River on the Charles M. Russell National Wildlife Refuge. The collective results of these efforts will provide a completely new assessment of bat diversity along the Missouri River.

Surveys in the Pryor Mountains and Bull Mountains found a variety of bat species, including Spotted Bats. This species had been expected in the Pryors and also suspected to be present in the Bull Mountains, but neither had been confirmed. Townsend's Big-eared Bat was also found in the Bull Mountains and at a new locality in the Pryors. A report summarizing this work will also be completed during the winter.

Other bat surveys were contracted this summer by the BLM in the Butte area and by Montana Fish, Wildlife and Parks in selected places. As we analyze and integrate new data collected by Heritage staff and colleagues, knowledge of the diversity and ecology of Montana's bats will continue to grow. We're also looking forward to a busy field season in the dark next year, with many new discoveries about the least known mammals in the state.

- John Carlson

References:

Chafin, K. 2003. Mosquito eaters: Bats getting a bad flap, er...rap. *Helena Independent Record*; Sunday, May 25, 2003.

Harvey, M. J., J. S. Altenbach, and T. L. Best. 1999. Bats of the United States. Arkansas Game & Fish Commission. 64 p.

Pierson, E. D. 1998. Tall trees, deep holes, and scarred landscapes: conservation of North American bats. Pp. 309-325, *In* Bat biology and conservation (T. H. Kunz and P. A. Racey, eds.). Smithsonian Institution Press, Washington, D.C. 365 p.

Prairie Potholes: Assessing a Watershed of Wetlands

Montana is on the southwestern edge of the North American prairie pothole region, a globally significant wetland area with immense value for not only for waterfowl breeding habitat, but also for a host of other species dependent on wetlands in this semi-arid landscape. Only a narrow strip across northern Montana has the glacial till with isolated depressions that trap spring runoff to create pothole wetlands. One major concentration of potholes is found on U.S. Bureau of Land Management (BLM) ownership in the Whitewater and Cottonwood watersheds north of Malta. As part of a watershed assessment process, the BLM partnered with the Natural Heritage Program to evaluate wetland health on a watershed scale.

Prairie Pothole region of North America (Graphic used by permission of authors. Euliss, N.H. et al. 2002. Using aquatic invertebrates to delineate seasonal and temporary wetlands in the prairie pothole region of North America. *Wetlands* **22**:256-262.)

Assessing wetland health across a landscape presents opportunities and challenges. The hundreds of small potholes in these watersheds are individually important, but their true value emerges when viewed collectively, as an entire landscape linked as an ecological system and habitat mosaic. These "isolated" wetlands are strongly influenced by the surrounding landscape in terms of water levels, water chemistry, sedimentation intensity, plant composition, and habitat value. Many potholes have been excavated to provide stock watering holes, most are grazed, and some have been invaded by non-native plants; the challenge is not only to evaluate status and threats of individual wetlands, but also to "scale-up" the inventory results into an assessment of condition across the entire watershed.

The larger goal of this work is to develop a quantitative, objective methodology that could be applied to other watersheds, independent of wetland type or acreage. This work parallels another effort by Heritage ecologists, in partnership with Montana DEQ, to develop a quantitative metrics for evaluating individual wetland sites.

We approached this watershed assessment with a combination of field data and Geograhic Information System (GIS) techniques. Field sampling identified plant communities and assessed impacts to the proper functioning of individual wetlands. GIS analysis provided a quantitative means to measure various factors related to wetland condition and health across the entire watershed.

This year's work focused on the Whitewater drainage in Phillips County; a complete report will be available early this winter. Preliminary results indicate that this watershed scores highly on the composite quality index with a high percentage of relatively undisturbed and intact wetlands/riparian areas. The technique will be refined and applied to the adjacent Cottonwood watershed in 2004. Results will give BLM land managers not only an inventory of wetland condition, health, and threats in specific watersheds, but also a methodology to better understand and maintain the health of wetlands across larger landscapes. - Greg Kudray

NRIS News - Web Services Survey

The Montana Natural Resource Information System (NRIS), our parent program in the Montana State Library, recently completed its second annual survey of website use, conducted from mid-September though October. These surveys are designed to help NRIS evaluate and improve services.

Of those responding, 60% visit the NRIS website at least several times a month and over 80% said they consider NRIS web services valuable or essential for their job, business or individual needs. Over 65% of those who responded use the NRIS web site primarily for government-related purposes, though 60% of those reporting a second type of use also tap it for personal needs.

Planning was the primary use for NRIS information, followed by research and resource management. Conservation was the 4th highest. Education, outreach and recreation also ranked high.

A number of respondents provided good suggestions and ideas for improving services and several offered high praise. One wrote "NRIS is truly a gem within state government and fills a very necessary, yet fairly unique role in disseminating digital information. I have often heard people from other states lamenting that they don't have something like NRIS."

The NRIS web site handles thousands of inquiries each month. During September and October, when the survey ran, the NRIS site logged over 124,000 visitor sessions, each lasting approximately 12 minutes. This translates to about 406 person-hours each day spent on the NRIS web site! - Jim Hill

Noteworthy Publication

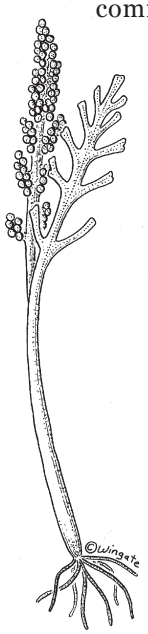
"Wildlife Encounters by Lewis and Clark: A Spatial Analysis of Interactions between Native Americans and Wildlife"

In the October 2003 issue of BioScience. The authors, Andrea S. Laliberte and William J. Ripple, used journal entries and GIS to map L&C wildlife encounters and human (mainly native) settlements. They found that even low human population densities had considerable influence on wildlife distribution and that overhunting and the introduction of the horse may have been major contributors to the historical absence of some species that are present in the archaeological record. - Greg Kudray

Mysterious Moonworts

Moonworts are fern-like plants of the genus *Botrychium*. They consist of a single leafy frond and a second frond that bears only the spore cases or "sporangia". In the middle ages moonworts were considered magical plants that were gathered by moonlight and used in incantations to raise the dead. Seventeen species of moonworts have been found in Montana, most are extremely small, inconspicuous plants. Many of these are rare, with nine considered Species of Concern (S1-S2) in Montana and also globally rare (G1–G3). Three other Montana species and a hybrid are considered Potential Concern (S3).

This past summer, the Natural Heritage Program conducted surveys to locate the slender moonwort, *Botrychium lineare*, the most elusive of our moonworts and one of the rarest plants in Montana and in North America. The slender moonwort has been found only 10 times since 1980 in the western U.S. and Alberta, with the largest number of documented occurrences in Montana. A few older records ranging from 1902 to 1968 are scattered through five western states and – enigmatically – the provinces of Quebec and New Brunswick. This plant's habitat preferences are equally enigmatic, having been found on roadsides, in grassy meadows, along a creek, on a limestone shelf, along a woodland trail, and in shaded woods.



Botrychium lineare
Illustration by Janet Wingate; From 'Colorado Rare Plant Field Guide'

Slender moonwort was petitioned for listing under the Endangered Species Act in 1999; the U.S. Fish & Wildlife Service found that listing was warranted but precluded by higher priority species. Many botanists feel there is still too little known about this plant to accurately assess its actual distribution and status. The Heritage Program received a Section 6 grant from the U.S. Fish & Wildlife Service in 2003 to gain better information on this seldom-seen plant.

Our surveys this past summer, conducted by consulting botanist Drake Barton, succeeded in relocating three previously documented populations along the Rocky Mountain Front in Glacier National Park and the Blackfeet Reservation. (We did not attempt to relocate an older record on the Flathead Reservation in the Mission Mountains.) Drake also discovered one new population in Glacier Park. All these populations are along roadsides — we have not yet found any populations in more "naturally disturbed" settings.

Curiously, rare moonwort species are often found growing together in what have been called "*Botrychium* communities" or "genus communities." Indeed, Drake's surveys for the slender moonwort turned up new populations of three other globally rare moonworts, including *Botrychium paradoxum* (peculiar moonwort), *B. ascendens* (upward-lobed moonwort), and *B. hesperium* (western moonwort).

Although slender moonwort is not an easy plant to find, there is ample potential habitat on the Rocky Mountain Front in Glacier National Park and nearby areas. It may be just a matter of time – and botanical vigilance – before other populations are found. Botanists working in this area are encouraged to be alert for these inconspicuous plants in roadside areas and especially in open native habitats. Identification of moonworts can be challenging – consult our on-line Field Guide for diagnostic characters as well as habitat descriptions. Also, populations are often small (or appear small, as plants may remain dormant below ground for years at a time), so caution should be exercised in making collections.

- Sue Crispin

Observations Wanted!!

Please send your observations/records for any Montana Species of Concern you observe or collect so we can update the MTNHP databases. Field forms are available for download from our website(http://nhp.nris.state.mt.us). Look under "Submit Data." THANKS!

Montana Heritage Program Welcomes...

Dave Stagliano, our new Aquatic Ecologist, joined the staff in early November. Dave was formerly an Associate Program Leader in Aquatic Zoology with the Michigan heritage program, and most recently, served as an invertebrate taxonomist for EcoAnalysts, a private consulting firm in Idaho. He has also worked for the U.S. Geological Survey in Denver and the Tennessee Valley Authority in Tennessee. Dave has a B.S. in Ecology from Cornell University and an M.S. in Environmental Entomology from the Kansas State University.

Kathy Lloyd joined us in July as a Data Assistant. Kathy is a native of the Helena area, and has been very active in the Montana Native Plant Society, both locally and statewide. Her part-time work for Heritage has so far focused on cleaning up our references database and uploading data for the on-line Field Guides, where her keen eye for detail has been a great asset.

and says Thanks to...

Curtis Bjork joined us as a Botany Intern in July, as he was finishing his Master's degree in Botany at Washington State University. He brought an impressive knowledge of the northwestern U.S. flora and his excitement for Montana's plants and landscapes. Curtis made great contributions to our summer inventory projects, including surveys of Spaulding's catchfly and inventory work for the Dillon and Butte Offices of BLM. Thanks, Curtis!

Joe Johnson, bat enthusiast, joined us as a Zoology intern. Joe spent his summer with Heritage Zoologists mist-netting and listening (via computer) for bats throughout the state, as well as counting grassland birds in Phillips County and catching Harlequin Ducks in W. Montana. Thanks and good luck in grad school Joe!

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Did You Know?

Pallid Bats (*Antrozous pallidus*) are unique among the bats of Montana in that they capture prey items on the ground after an aerial search. Their primary prey items are Arthropods (moths, beetles, grasshoppers etc).

Need Data?

You can now submit requests using the NRIS **Request Tracker**. Click "Get Data" on our homepage

http://nhp.nris.state.mt.us/